

# THE FORM AND CONTENT OF DERIVATIONAL RELATIONS

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## Abstract

Morpheme based theories of word structure encourage us to think of derived words (e.g. "inflatable") as built by adding one complex of phonological, syntactic and semantic content (/~əb|/, Adjective, 'able to be VERBED') to another (/ɪnflɛjt/, [<sub>Verb</sub> — (+NP)], 'INFLATE'). This model lacks generality in a number of ways, however. (a) Derivational relationships may not involve the simple addition of material. This result is familiar with respect to the expression of morphological categories, under the name of 'non-concatenative' morphology. It is not hard to show that not only the formal reflection of derivational morphology, but also its morphosyntactic and semantic content, may involve truncations, re-arrangements and replacements that yield non-monotonic effects. (b) Phonological, syntactic and semantic relations are not always bundled together in units as implied by the morpheme-based view. Languages often show unitary relations of form, grammar and/or meaning, each of which is found in association with a variety of relations in the other domains. (c) Derivational relations do not always have the directionality one would expect on the basis of the assumption that they are established by adding a new minimal sign to an existing base. (d) The relations characteristic of derivational morphology are not limited to the composition of complex lexical items. A category of (special) clitic elements signal relations between phrases that are closely parallel to the relations between words that are marked by derivational morphology.

This paper illustrates the situations noted above from a variety of languages, and argues (following lines originating in the work of Boas, Beard and Jackendoff, among others) that a much more general conception of derivational relations is required than that which we have inherited from structuralist morphology.

## 1 Introduction

In a paper read to a previous meeting of the MALC (Anderson 1983), I devoted my attention to a set of arguments against the utility of the classical notion of the 'morpheme' in analyzing and describing inflection. The present paper casts a comparably skeptical eye on the extent to which morphemes (as these are classically conceived) are appropriate units in terms of which to describe derivational relations. I will argue below that insofar as description in terms of morphemes (and their concatenation into morphologically complex words) makes empirical predictions about the kinds of regularity we should find in the morphologies of natural languages, these predictions are not borne out. As a result, a more general notion of the rule-governed regularities that characterize morphological relations (along the general lines sketched in Anderson 1992) should replace the conception of derivation based on an inventory of derivational morphemes that can be combined with bases. These ideas are not especially new; neither are they confined to my own work, but I think their importance has not been as widely appreciated as it ought to be.

Let us begin by delimiting the problem. Accepting (at least as a basis for discussion) the notion that *inflection* is the morphology that provides a formal reflection of characteristics of the syntactic structures in which words appear, we can define *derivation* as the study of relations among distinct lexical items. These in turn, can be thought of to a reasonable approximation as (Saussurean) *signs*, the basic complexes of sound, meaning and morphosyntax that realize the terminal nodes of phrase markers, and thus constitute the overt terms of syntactic relations.

This account is based on our understanding of the basic notion of a sign, and the claim that the sign relation is fundamental to the nature of language. Since deSaussure, linguists of all persuasions have called attention to the notion that linguistic units are composed by (at least partly) arbitrary associations of sound and meaning. Theories of language that attempt to deal seriously with syntactic structure (in addition to sound and word structure) quickly confront the fact that the grammatical behavior of a form is not, in general completely predictable from its other properties, and so the notion of a sign is presumably to be enriched by the association between these other properties and what we can call *morphosyntactic* properties. At a minimum, this involves an indication of major lexical category, but most theories of grammar quickly arrive at various other morphosyntactic properties attached to signs.

The core case, which is supposed to motivate our overall understanding of the nature of linguistic objects in general, is that of the *minimal* sign, minimal in the sense that its various aspects are clearly related in ways that cannot be decomposed further. This state of affairs is exemplified by a word like 'cat' = {/kæt/, Noun, 'CAT'<sup>1</sup>}, a word that displays a manifestly irreducible connection among properties of sound, morphosyntax and meaning.

<sup>1</sup>I follow more or less standard practice in having little to say about the details of what semantic representations look like. Except where details of the formal structure of meaning are at stake below, then, I will be content with letting things like 'CAT' stand in for a serious account.

Appeals to the notion of the sign in morphology are intended to solve the basic problem of how words are related to one another as other than fellow members of a list of individually arbitrary items. For of course not all words are as simple as *cat*, and we know that many (maybe even most) bear partial phonetic and/or semantic similarities to others, belying the notion that each word is a completely isolated association of properties from various domains. Morphology is intended to answer the question: What is it for words to be formally related to one another? In deSaussure's terms, what is the nature of a *partially motivated* sign? Answers to these questions are supposed to be resolved by an appeal to the *morpheme*, a unit that forms a part (commonly, a proper sub-part) of a word, and that is thought to come closer to the ideal of the minimal sign than words do.

If the signifying function of words can be reduced to a combination of the properties of its constituent signs, as this picture suggests, it would seem we can also account for morphological relatedness among words in the same terms, simply by equating this notion with the property of having one or more morphemes in common. Partially motivated signs are those words that contain as a subpart a more basic sign (a morpheme) which they share with other words. Derivation, in turn, can be seen as the composition of such elementary signs (more generally, of potentially complex but decomposable bases) with an additional element, as in (1) below.

(1) Derivation as composition of signs:

$$\left\{ \begin{array}{c} /ɪnfleɪt/ \\ [v \text{ — } [NP]] \\ \text{INFLATE} \end{array} \right\} + \left\{ \begin{array}{c} /əb/ \\ \text{Adj} \\ \text{ABLE TO BE VED} \end{array} \right\} \Rightarrow \left\{ \begin{array}{c} /ɪnfleɪtəb/ \\ \text{Adj} \\ \text{ABLE TO BE INFLATED} \end{array} \right\}$$

‘inflate’                      +                      ‘-able’                       $\Rightarrow$                       ‘inflatable’

If we take this picture very seriously as a model of the structure and formation of words, it has a number of quite substantive consequences. These include the following: (a) If the formation of complex words proceeds by the addition of derivational morphemes to a base, it should follow that composition of signs is strictly *monotonic*. That is, the relation between the properties of a base and of other words derived from it should be an additive, concatenative one, with the base constituting a proper sub-part of the derived form (as, e.g., the form and meaning of *inflate* can be found within *inflatable*). (b) Since the basis of the sign is the indissoluble unity of sound and meaning (and [morpho]syntax), it should follow that derivationally related word sets similarly display unitary relations of sound that are related consistently with unitary relations of meaning and of morphosyntax. (c) Derivational relations ought to be consistently *directional*, since properties of the base form are presupposed by a derived form that consists of this element plus an additional marker. And finally (d) derivation is generally considered to be (by definition) a relation of words to other words, such that whatever properties we might uncover for derivational relations in general would be properties of words, rather than of some other kind of linguistic unit.

In fact, we will argue that all of these consequences are incorrect. The sections below will suggest that a linguistically significant account of the domain of phenomena that fall pre-systematically under the heading of derivation display quite different properties from those we would expect if the 'composition of morphemes' account were correct. In section 2, we will show that the formation of complex derived forms in the general case is "non-concatenative" (hence, non-monotonic) in all of the domains of sound, meaning, and morpho-syntax. Section 3 will then address the question of whether the same content in one domain is consistently associated with specific content in others; we will conclude that the relation between individual relations of form and relations of meaning or morpho-syntax is often many-to-many, rather than one-to-one as suggested by the picture of a derivational category as constituted by an elementary sign. In section 4, we will discuss cases in which a consistent choice of one or the other term in a derivational relation between classes of words as the 'base' of the formation is difficult or impossible. Section 5 will argue that the same properties that turn up in derivational relations among words also characterize relations between phrases, as mediated by the presence of a class of clitics. Finally, section 6 will offer some conclusions about the direction in which theory should proceed to arrive at a more satisfactory account of derivation in general than is provided by the traditional one.

## 2 The Non-Monotonic Nature of Derivation

With respect to the forms of words, it is by now generally accepted that not all morphology is monotonic. One way of putting this is the observation that some morphology is "non-concatenative": i.e., cannot be described in terms of the concatenation of phonological strings corresponding to the content of a set of constituent morphemes. The enrichment of our conception of phonological structure from a strictly segmental character to current ideas of autosegmental and metrical structure makes this point less obvious, but it is still not seriously in doubt (see Anderson 1992 for discussion). Some of the kinds of morphology that make this point are illustrated by derivationally related sets of forms in (2) below.

- (2) Replacement : (Apophony) *sell/sale, sing/song, blood/bleed, food/feed, etc.*;  
 (consonantal mutation) *believe/belief, prove/proof, bath/bathe, speak/speech etc.*;  
*breath/breathe, glass/(re)glaze.*
- Subtraction : Icelandic *hamr* [hamr] 'hammering' from *hamra* [hamra] 'to hammer',  
*snupr* [snü:pr] 'reproof' from *snupra* [snü:pra] 'to chide'.
- Others : Exchange rules ( $A \Leftrightarrow B / \text{---} X$ ); Chain-shifts ( $A \rightarrow B, B \rightarrow C / \text{---} X$ ;  
 Metathesis).

The existence of such morphology, whose interest for us derives from the non-monotonicity of its formal expression, is quite familiar. Somewhat less well known is the fact that what is true for phonology is equally true for the other aspects of derivation (or 'word-formation' in

general). That is, neither the meaning nor the morphosyntax of a derived form is simply an additive function of the meaning or morphosyntax of its base (and those of the derivational element), any more than its form is always that of its base plus an affix. This is something that has not been as prominent as perhaps it ought to be, in part because we usually get along with representations of meanings (and thus of relations between meanings) that are much less specific and precise than our representations of phonological form. When we look more closely than we are accustomed to do, though, we find that all of the problems of purely monotonic morphology which we know from the study of form also appear in the study of content.

A moderately common sort of derivation with non-monotonic semantics is exemplified by the interpretation of a substantial class of 'middle' verbs in Icelandic (Anderson 1990). These are formed by the adjunction of a suffix /-st/ to a base Verb, with a fairly wide range of associated interpretations. In the Verbs in question, the meaning of the derived forms are related to the meanings of the corresponding bases through the semantic subtraction of a causative layer, as illustrated in (3) below.

(3)	gleðjast	'rejoice'	gleðja	'gladden (tr.)'
	kveljast	'suffer'	kvelja	'torture (tr.)'
	lýjast	'get tired, worn out'	lýja	'tire (someone) out'
	hefjast	'begin (intrans.)'	hefja	'begin (tr.)'
	opnast	'open (intrans.)'	opna	'open' (tr.)'
	finnast	'exist, be to be found'	finna	'find'
	heyra	'be audible'	heyra	'hear'
	týnast	'be, get lost'	týna	'lose'
	ágoggast	'(of a fish) be hooked'	gogga	'catch with a hook'

Apparently, we should represent the semantics of the bases here as something like (CAUSE  $x$ , (BECOME (P  $y$ ))) (e.g., 'SBJ causes OBJ to become tired, miserable, started, open, etc.). The addition of the ending /-st/ has the effect of deleting the highest predicate (CAUSE  $x, y$ ) from this structure (and also deleting the corresponding argument position and/or  $\theta$ -role from the syntax). Here, then, is a formation in which the apparently derived form *lacks* syntactic and semantic material which is present in the base—a clear instance of non-monotonicity in a derivation, but this time in the domain of the content of words rather than that of their form.

The class of 'middle' Verbs in /-st/ in Icelandic has an interesting history, and that history furnishes some insight into how the present situation came about. The ending /-st/ represents a modern reflex of certain instances of the reflexive pronoun (*sik* in Old Icelandic), in a clitic form. In many languages, reflexives appear when one argument position of a Verb comes to be bound to another, with the result that the syntactic and semantic autonomy of one of the arguments is suppressed. In some cases, the result may be re-interpreted as if the Verb really had only one argument (cf. English *Fred is trying to behave 0/himself/\*his wife*),

although it can retain the syntax of a transitive. In the Icelandic case, however, the originally syntactic reflexive pronouns associated with the 'middle' Verbs have become simply part of the morphology of the Verb, and do not occupy an argument position (either semantically or syntactically). Indeed, some of these Verbs can take a reflexive complement in addition to the *-st* ending, as illustrated in (4) below.

- (4) a. Hann skammast sín fyrir fjölskyldu sína  
       he is ashamed self(gen.) from family his  
       He is ashamed of himself on account of his family.
- b. Honum fannst sér (vera) ofaukið í þessum félagsskap  
       he(dat.) found self (be) superfluous in this company  
       He felt himself superfluous in this company.
- c. Unglingunum fannst sig skorta verkefni og starf  
       the youths(dat.) found self lack exercise and work  
       The young people found that they missed exercise and work.

The original syntactic source of the material which now constitutes the */-st/* ending can thus illuminate the path by which their interpretations arose (because reflexives often are associated with argument absorption), but as a synchronic analysis this is just as irrelevant as the etymology of a word is to the determination of its phonological form. In Modern Icelandic, these Verbs are a derivational category rather than a class of phonologically unusual syntactic reflexives. Some arguments for this conclusion (from phonology and elsewhere) are given in Anderson 1990. And what is of interest to us here is that this derivational class, in cases like those of (3), can be associated with the semantic (and syntactic) equivalent of 'subtractive' morphology.

The Icelandic case is not at all isolated. To take another example from the literature, consider the class of Panare [Carib] detransitives (cf. Payne 1990) which is exemplified in (5) below. As these forms illustrate, there are a number of formally distinct prefixes that can be added to transitive Verbs in Panare to produce detransitivized correspondents. As in the Icelandic examples, the relation is one which (while straightforwardly monotonic in its formal reflection) involves the loss of a syntactic argument position and of the corresponding argument from the semantic representation. Many of these examples relate a transitive base with causative semantics to an intransitive derived form whose interpretation is that of the simple action brought about by an agent of the corresponding causative. Others are more complex, but if we accept the general accuracy of the glosses provided by Payne, there is no reason to doubt that at least in a great many cases we have to do with semantically and syntactically non-monotonic derivation.

(5)	Prefix	Transitive	Intransitive
	<i>ch-/s-</i>	incha 'beware of, fear'	chinchama 'think'
		irema 'feed'	chirema 'eat'
		amaika 'keep/put'	samaika 'sit'
		apē 'begin (nominal Obj)'	sapē 'begin (clausal Comp)'
		ēwachika 'make sneeze'	sēwachika 'sneeze'
		e'ka' 'bring'	se'ka' 'come'
		uka' 'kill'	suka' 'die'
	<i>t-</i>	ēka 'fatten'	tēka 'be fat'
		ēsa 'straighten'	tēsa 'be straight'
		iñan 'raise'	tiñan 'rise'
	<i>w-</i>	marapa 'chase'	wēmarapa 'escape, become lost'
		muku 'close (tr.)'	wumuku 'close (intr.)'

When relations of this sort are discussed in the descriptive literature, the lack of monotonicity they imply is usually obscured by the relatively low standards we commonly enforce on descriptions of meaning. In the Panare case, for example, Payne provides a gloss for the prefixes illustrated in (5) as 'DETRANS'. If we treat e.g. *sēwachika* 'sneeze' as *s-* 'DETRANS' plus *ēwachika* 'make sneeze' the result looks superficially additive, but as soon as we look even a little more closely into how this translates to the semantics of 'sneeze,' this must be seen as an illusion.

The empirical nature of a claim of monotonicity in derivation is relatively clear when we talk about the specifics of phonological and semantic form, and it is equally clear that such a claim cannot be maintained in general. When we turn to the area of morphosyntax, however, the issues are more difficult. The morphosyntactic characterization of a word (and hence that component of its nature as a sign) includes at least the following: (a) indication of major word class, together with (b) indication of further subdivision within that class, such as grammatical gender, idiosyncratic number (as with *pluralia tantum* Nouns), etc.; and (c) indication of restrictions on the syntactic environment within which the word may appear, of the sort usually called sub-categorization restrictions. Now a very large literature has been devoted to investigating the extent to which properties of this sort (especially sub-categorization requirements of Verbs) can be deduced from the semantics of an item. Insofar as such prediction is possible, we cannot regard the morphosyntactic properties of a word as independent of its meaning, and hence the issue of monotonicity in the morphosyntax of derivation is not independent of the corresponding claim in semantics. There seem, however, to be at least some clear cases in which derivational relations are associated with non-monotonic changes in the morphosyntactic content of derived forms in the absence of a corresponding effect on meaning.

An example of such derivation with non-monotonic (specifically, subtractive) effects on morphosyntax is provided by some well-known classes of nominals in English. With respect to the productive cases of {-er} nominals, Hovav & Levin (1992) distinguish two sub-classes. Some of these Nouns (typically, those with an agentive interpretation) inherit the argument

structure of the base Verb, while others (typically, those with an instrumental interpretation) do not. Contrast the agentive and instrumental interpretations of *wrapper* in (6) below.

- (6) a. The best job for Fred would take advantage of his experience as a wrapper {of/\*for} presents in fancy gold paper at Tiffany's.  
 b. The best use I can think of for *The New York Times* is as a wrapper {for/\*of} fish that didn't keep well overnight.

The argument structure of the base Verb *wrap* specifies it as transitive, taking a direct object. The corresponding agentive nominal inherits this property, and (as is generally the case with direct object complements of nominals in English) the complement appears with the empty case-marking preposition *of*. The instrumental nominal derived from the same Verb cannot take such a syntactic complement, however, although the corresponding semantic argument can be specified obliquely by an adjunct expression with *for*. Hovav & Levin's claim is that the agentive {-er} nominals can inherit the argument structure of their base Verbs, while the (formally identical) instrumentals necessarily have a null syntactic argument structure (and thus can only be accompanied by syntactic adjunct phrases). They draw an analogy with two types of derived nominals (previously distinguished by Grimshaw), referring to events on the one hand and to results or other non-event related properties of an action on the other. Compare the two senses of *examination* ('event of examining' vs. 'test instrument') in (7) below.

- (7) a. The examination (of the graduating seniors) lasted three hours.  
 b. The examination (for/\*of the students) was eight pages long.

'Event' derived nominals can take complements and and refer to events. Non-event derived nominals do not take complements and refer to objects, results of actions, etc. rather than events. Notice that not all 'event' nominals preserve the complement structure of their related Verb: the nominal *exam* has both an event sense and a non-event sense, but does not allow complements on either reading as illustrated in (8):

- (8) a. The exam (for/\*of the graduating seniors) lasted three hours.  
 b. The exam (for/\*of the students) was eight pages long.

Hovav & Levin attribute these effects (in both the {-er}-cases and the others) to the loss of argument structure, including an 'event' position, in the derivational relation. That is, the operations that create non-agent {-er}-nominals and non-event derived nominals eliminates the argument structure of the base Verb, while the operations that create agentive {-er}-nominals and event derived nominals preserves argument structure (including the 'event'



position). A variety of examples (including those in (8)) show that the correlation is not quite this straightforward, but what matters to us here is simpler. Since at least SOME derived (and {-er}-) nominals do show a loss of morphosyntactic properties with respect to those of their derivational base, we must conclude that derivation can be morpho-syntactically subtractive and thus non-monotonic in this domain as well as those we have already discussed above.

Subtraction is formally the simplest form of non-monotonicity, but it is not the only one. We also find cases where the effect associated with a derivational relation is to re-arrange or substitute material in the semantic and/or morphosyntactic content of a form, analogous to apophony and other mutations in the phonological shape of derived words. Again, such replacement is not in general strictly additive or monotonic.

A rather common instance of such a situation is the derivational relation between straightforwardly transitive Verbs and Verbs with the same arguments, but where the original direct object is formally oblique or indirect. This is the sort of relation found sporadically in the English lexicon (with no overt derivational marker), in pairs such as *Fred shot John (in the head)* vs. *Fred shot at John's head* (see Anderson 1988) for some discussion). In many other languages, such pairs exist with a more systematic status, sometimes with an associated marker on the Verb as well as a change in the marking of the object argument. An example is provided by Warlpiri (Nash 1986, Laughren 1988). In this language, basic transitive Verbs have the case frame [erg+abs], which can be replaced by [erg+dat]. The [ergative] argument in each case corresponds to the English subject, with the [absolutive] or [dative] argument representing the object. The difference is that when the object is marked [dative] instead of [absolutive], there is an implication that the action was not carried out fully or successfully, quite parallel to the 'holistic' vs. 'partitive' distinction in English pairs. Warlpiri examples are provided in (9), but similar pairs could probably be given from any of a number of languages, including many that have been discussed with respect to the notion of '2 → 3 retreat' in the Relational Grammar literature.

- (9) a. Yarla-rna pangu-rnu ngajulu-rlu  
yam-1sg dig-past 1sg-erg  
I dug up yams
- b. Yarla-ku-rna-rla pangu-rnu ngajulu-rlu  
yam-dat-1sg-3dat dig-past 1sg-erg  
I dug for yams
- c. Walya-rna pangu-rnu ngajulu-rlu  
earth-1sg dig-past 1sg-erg  
I dug the earth
- d. <sup>2</sup> Walya-ku-rna-rla-jinta pangu-rnu ngajulu-rlu  
earth-dat-1sg-3dat-dd dig-past 1sg-erg  
I dug at the earth

<sup>2</sup>In this example the [dative] argument is reflected not only by a Dative clitic but by a further marker of the 'double dative' construction. The difference between this and the simple dative is not relevant to our concerns here.

One reason for choosing Warlpiri to exemplify this situation is the existence of a relatively explicit proposal, due to Laughren (1988), for the associated semantics. She suggests that the difference in interpretation in such pairs is due to a re-arrangement of the components of the semantic representation, as suggested in (10) below.

- (10) a. [<sub>Verb</sub> — [<sub>Erg</sub>][<sub>Abs</sub>]], 'I GOT YAMS *by* I DIG'  
 b. [<sub>Verb</sub> — [<sub>Erg</sub>][<sub>Dat</sub>]], 'I DUG *in order to* I GET YAMS'  
 c. [<sub>Verb</sub> — [<sub>Erg</sub>][<sub>Abs</sub>]], 'I BROKE UP EARTH *by* I DIG'  
 d. [<sub>Verb</sub> — [<sub>Erg</sub>][<sub>Double-Dat</sub>]], 'I DUG *in order to* I BREAK UP EARTH'

Laughren's proposal (which is couched entirely in terms of a presumed lexical relation between homophonous Verbs taking different case frames) seems quite plausible, and if accepted, would provide us with an instance of a sort of semantic analog of metathesis in phonological form. This non-monotonic change is associated in Warlpiri with a replace relation in the morphosyntax (specifically, a change in the case-marking requirements) of derived transitive Verbs. In this instance, there is no phonological marker of the derivational relationship, but of course 'zero-derivation' is hardly an unprecedented phenomenon.

The Warlpiri case is typical of many languages with "2 → 3 Retreat" as a systematic process affecting transitive Verbs. A similar example where the associated semantic effect is rather unexpected is provided by the phenomenon of "Ergative Switching" in another Australian language, Kala Lagau Langgus (Bani & Klokeid 1976). In this language, the normal case marking pattern with transitive Verbs marks the notional subject<sup>3</sup> with [ergative] while the notional direct object appears in the (unmarked) [absolutive]. As Bani and Klokeid note, however, an alternative case marking pattern is available for the same Verbs, with the notional subject unmarked and the notional object marked [ergative], as in (11) below.

- (11) a. Ngath    thusi    tebola    gima    wanan  
       1sg-Erg book table-Loc on    left [Trans.]  
       I left the book on the table  
 b. Ngai        thusin    tebola    gima    wani  
       1sg-Nom book-Erg table-loc on    left [Intrans]  
       I left [all] the books on the table  
 c. Ngath    thusil    tebola    gima    wanamin  
       1sg-Erg book-Pl table-Loc on    left-Pl [Trans]  
       I left [the] books on the table

<sup>3</sup>In order to avoid involvement in the issue of grammatical relations in morphologically ergative languages, I refer here to the "notional" subject and object, the NP's corresponding to the subject and object (respectively) in similar English sentences. Nothing of importance hinges on this terminology, as far as I can see.

Comparing (11a) with (11b), we see that the latter carries the implication that the leaving of books on the table was completely carried out, in that all of the books were left. This is not simply a matter of marking the object as plural, since a quite distinct mechanism (illustrated in (11c)) is employed for that purpose. Rather, we have the somewhat unusual circumstance that the "ergative switched" form (11b), which looks as if it has undergone a form of "2 → 3 Retreat" carries not the partitive interpretation usually associated with this construction, but rather the opposite "holistic" interpretation that the action was carried through to completion.

The key to this situation, I think, is the fact that the "ergative switched" Verbs are inflected as intransitives. On the theory of Anderson 1992, we can characterize this semantic difference as linked to a difference in morphosyntax which is one component of a lexical (derivational) relation. Ordinary transitive Verbs are morphosyntactically characterized as agreeing with two arguments ( $[+V, - [ - ]]$ )<sup>4</sup> and as sub-categorized for a direct object. The related 'ergative switched' Verb is morphosyntactically intransitive ( $[+V, - ]$ ) and sub-categorized for an inherent case object ( $[+ - [NP, +Erg]]$ ), an oblique complement with which the Verb does not agree. Structural case marking on the subject and the (non-inherently marked) object is controlled by the Verb's morphosyntactic representation. The holistic semantic interpretation can then be associated with inherent Ergative case. The morphosyntactic component of the relevant derivational relation might be sketched as in (12) below.

$$(12) [Verb - [Erg], [Abs]] \rightarrow [[Verb - [Abs]] [Erg]]$$

The point of this example lies not in the details of our proposed account of "ergative switching" in Kala Lagau Langus, but rather in the fact that however we choose to account for the phenomenon, it would appear to involve a lexical relation (between "basic" and "ergative switched" forms of a Verb) whose morphosyntactic component is not simply additive. Rather, the relation seems to require the re-organization and partial replacement of the morphosyntax of the base, with semantic correlates that follow from this (taken together with general principles of interpretation in the language).

I conclude, then, that derivational relations are not, in general, monotonic in character. They may involve subtractive or replacive operations on the morphosyntactic and/or semantic content of an item, as well as on its phonology. To the extent the traditional account of derivation is based on the addition of derivational morphemes to a base and thus implies monotonicity, it must therefore be seen as deficient.

<sup>4</sup>See Anderson 1992 for the notation employed here.

### 3 Relations between Form and Content in Derivation

We next turn to the question of whether the components of a derivational relation in the domains of form, meaning and morphosyntax actually go together in the unitary way suggested by uniting them in a basic sign, as implied by the traditional picture of derivation based on morphemes. Are sound and meaning really as solidary as that account presumes? It was pointed out some time ago (Bazell 1952) that even though we may define a morpheme as a minimal sign, and then provide procedures for (a) identifying aspects of form that express a single function, and (b) analyzing the content expressed by formal markers, this does not ensure that the analyses of form and content will always be isomorphic. Indeed, this assumption underpins what Bazell calls the "Yale morpheme,"<sup>5</sup> one of his canonical instances of the "Correspondence Fallacy."

But what is the alternative to the proposal that relations of sound, meaning, and morphosyntax are linked together in derivational morphemes in the same way form and content are linked in basic linguistic signs like *cat* (= {/kæt/, [+N], 'CAT'})? The most extensive argument against the traditional view has been developed by Beard (1995 and elsewhere), who stresses the idea that derivation is a completely abstract notion based on semantic and morphosyntactic connections among linguistic objects. Individual "derivations" in this sense may correspond to no, one, or several markers selected from a general set of formal relations. A single formal marker *typically* goes with a single derivational content, but this is not true in general, so we must separate the two kinds of relation.

There are two ways in which form and content might logically deviate from an isomorphic relation, and both of these are in fact abundantly exemplified in natural languages: either a single function corresponds to a number of quite distinct formal markers, or a single marker may correlate with a range of different functions. The existence in natural language of synonymy, or its opposite homophony or polysemy, is hardly a revolutionary or novel claim. Its importance has often been underestimated, however: in fact, every such instance is implicitly a challenge to the notion that form-function solidarity in the linguistic sign is the cornerstone of morphological structure.

Instances of apparent derivational *synonymy*, where a single function corresponds to many forms are of course quite commonly remarked. A straightforward example is provided by the case of English action nominals, like *destruction*, *settlement*, *arrival*, *laughter*, etc. Essentially every verb has such a nominal, and indeed only one, but the form varies from Verb to Verb (although there are a few particularly common variants such as /-tion/ and /-ment/). If a morpheme, as a basic sign, is an irreducible unity of sound and meaning, however, then where we have multiple forms (not distributed in accord with purely phonological regularities of the language, as the variants of the English action nominal clearly are not), we must *a fortiori* have multiple morphemes. What is intriguing about this situation is the fact that

<sup>5</sup>We note with no ironic intent that the notion of morphological structure current at Yale has changed since Bazell's day.

the relation of the action nominal to the base Verb is entirely parallel, regardless of the concrete formal marker of the individual nominalization. This suggests that all of various formally distinct nominalization 'morphemes' are functionally equivalent or synonymous.

Recall, however, the injunction of your High School English teacher, who may well have told you that "there are no true synonyms." This principle of functional differentiation seems to have a fairly sound cognitive basis, and appeal to it has been significant in explaining, for instance, facts about language acquisition. On this basis, we would expect each variant of the action nominal formation to be functionally differentiated from the others; and indeed, where a single Verb has more than one such nominal, we do indeed find semantic specialization: cf. the difference between *recital* (a special sort of performance, limited to certain domains) vs. *recitation* (a generalized act of reciting). Why does the principle of "avoid synonymy" only come into play precisely when a single basic Verb has more than one nominalization, and not more generally with respect to the numerous formally distinct 'morphemes' of nominalization themselves? Note that this problem only arises because of the assumption that a single morpheme must unify a single function with a single form. If we were to describe derivation in a way that allowed us to generalize a single function to a variety of formal markers, we would not be led to such an unsatisfying conclusion.

The other side of this coin, where a single form expresses many functions, is generally described as mere (synchronically) accidental *homophony*. An example in the realm of derivation is provided by English {-er} nominals, already mentioned above. The formation of Nouns in {-er} from other words has a considerable range of quite distinct senses. The cases most remarked by linguists are those of deverbal agentives and instruments, but other large classes are provided by denominals meaning "person connected with (N)", such as *roomer*, *second-grader*, *honeymooner*, *carpet-bagger*, *golfer*, *Londoner*, *Pittsburger*; nouns referring to non-humans, somewhat parallel, such as *ten pounder*, *freighter*, *tanker*, *Nor'easter*, etc.; nouns from numbers, like *fiver*, *forty-niner*, *(seventy-)sizer*, etc.

As has been stressed by Janda (1982 and subsequent papers), it is actually quite common to find that a small number of formal devices are employed in a given language, each with a rather wide range of functions. Consider the amount of work done in English by /-z/, for example: not only is this the regular plural for Nouns, it is also the genitive marker on NP's, the third person singular present ending for Verbs, and the reduced (simple clitic) form of *is*. Indeed, between /-z/ and /-d/, essentially all of the productive inflectional morphology of Nouns and Verbs in English is included.

Such facts were arguably quite familiar to earlier generations of linguists, who had more to say about them simply to characterize them as instances of accidental homophony. In the grammars of the generation of the *Handbook of American Indian Languages* (Boas 1911 and subsequent volumes), a common division of descriptive labor is between "Grammatical Processes" and "Ideas Expressed by Grammatical Processes." The former refers to the formal markers employed in the language (Ablaut, truncation, particular suffixes, infixes, etc.) while the latter refers to the substantive content of morphological categories (tense, agreement,

deverbal agent Nouns, etc.).<sup>6</sup> Each of these could be studied and described independently of the other, and a complete morphological description involves those efforts plus statements about which "process(es)" will be found to express which "idea(s)." Implicit in this is the notion that a single idea may be expressed by one or by more than one process, while a single process may express one idea or it may be the expression of several distinct ideas. Thus a one-to-one link between formal markers and the content they indicate is avoided, a move that appears to have some advantages in the description of real morphological systems.

We conclude then, that the relations we think of as established by derivational morphology involve connections between forms and functions that in the general case have a many-to-many character, rather than the one-to-one character we would expect if the model of the Saussurian sign were fully adequate. To understand this many-to-many character, it is useful to separate the relations themselves from an understanding of the things that are related. The categories that constitute the end points of derivational relations (e.g. "agent nominal"), that is, have a reality which is not reducible to an individual derivational operation (e.g., "suffix {-er}"). Consider in this connection the class of English "agent nominals." A wide variety of these appear to end in {-er}, but as illustrated in (13) below, by no means all of these can be regarded as the result of suffixing {-er} to a base Verb.

- (13) a. [<sub>N</sub> [<sub>V</sub> bake]-r], [<sub>N</sub> [<sub>V</sub> preach]-er], etc.  
 b. [<sub>N</sub> [<sub>V</sub> butcher]]  
 c. [<sub>N</sub> carpenter]  
 d. adulterer, lawyer, astronomer, furrier, clothier, hatter, etc.

Among these forms, some like (13a) are straightforwardly derivable from Verbs in the way generally assumed. In other case, however, like (13b), the corresponding Verb is identical in form with the nominal, and it is problematic to claim that either is necessarily the base of the other. In still others, like (13c), there is no apparent corresponding Verb at all, although the agent nominal is formally just like other agent Nouns in {-er}. And finally, in a host of cases like (13d), the related word is not a Verb at all, but rather a Noun (*adultery, law, astronomy, fur, clothes, hat*, etc.) and the formal relation is sometimes more complicated than just the suffixation of {-er}. Despite these differences, however, the phonology, morphosyntax and semantics of all of these forms are quite uniform.

In fact if the class of interest is characterized by the conceptual structure of its members, it will also include forms that are not formally {-er} nominals at all, like *cook, judge, poet, musician, artist, linguist*, etc. We need to be able to refer to this larger class of "agent Nouns" in order to get the facts about disjunctive formation right, along lines discussed by

<sup>6</sup>The distinction is clearly a fore-runner of that made by Beard (1995) and elsewhere between 'derivations' and 'affixation operations.' A major component of Beard's view is precisely the non-isomorphism between these two categories.

Kiparsky (1982). As Kiparsky noted, we want to say that e.g. *cooker*, *judger* cannot have the expected agentive reading. The reason for this is apparently the existence of *cook*, *judge*, words which already appear in the lexicon of English with the interpretation of agent Nouns corresponding to the homophonous Verbs. Note that it is not *cooker* itself that is excluded: this word exists, but only with the instrument reading. *Cook* (the Noun) is a member of some class containing agentives but the class of {-er} nominals is not the right one. The generalization that any given Verb has (at most) a single corresponding Noun within this class, however, can only be stated if we recognize the linguistic significance of such constructs, which are not accessible if derivational categories are supposed to be reducible to the presence of specific derivational morphemes.

It appears, then, that an adequate understanding of the nature of derivation requires us to recognize a number of sorts of class, not all of which are given by the notion of derivational morphemes as Suassurean minimal signs. We need, for instance, a class characterized by the morphosyntax and the semantics of agent Nouns, in order to state the disjunctive relation among potential member of this class in correspondence with Verbs. We also need a way to refer to the phonological class of Nouns ending in /ə/, in order to express the fact that particular semantic types (agentives, instrumentals, 'person or event connected with (Noun)', etc.) are generally associated with such words. Neither of these classes is coextensive with the result of adding any particular derivational morpheme<sup>7</sup> to a particular class of bases.

The description of derivation is not limited to the delimitation of such classes, of course. More generally, we must describe derivation in terms of relations that map some members of one class (e.g., Verbs) onto some members of another class (agentive nominals ending in /-ə/, for example). The point to bear in mind, however, is that the relations themselves do not have the simple, homogeneous, and exhaustive character implied in the notion that derivation is equivalent to the addition of a derivational morpheme (a complex of sound, meaning, and morphosyntax) to a base.

## 4 The Directionality of Derivational Relations

We generally think of derivation as a process that leads from bases to derived forms. Once we take seriously the fact that the classes connected by derivational relations have their own linguistic significance, however, the presumed directionality of derivation no longer has the same character of apparent logical necessity it has on a view where morphological relatedness (and hence derivational classes) can be reduced to the sharing of classical morphemes. Indeed, when we look at a range of derivational relations, we see that they are not necessarily (uni)directional.

An example of a productive relationship whose directionality cannot be established in a

<sup>7</sup>A morpheme of the classical sort, that is. Some authors, such as Beard, use the word 'morpheme' in ways that do not correspond to a minimal sign.

consistent way is provided by pairs of transitive and intransitive Verbs in West Circassian (Dumézil 1975). In this language, transitive Verbs in C(ə) are regularly paired with intransitives in Ce. When we consider pairs such as those in (14) below, it is evident that in some instances we would wish to consider the intransitives as 'basic' and in others the transitives, although the formal relation is identical in both cases.

- (14) a. se-txe 'I write [intrans.]; zə-txəλ se-txə 'I write a letter'  
 b. s'əzə-r me-tħač'e 'the woman washes (i.e., does the dishes) [intrans.];  
 s'əzə-m šəq'ə-r ye-tħač'a 'the woman washes [trans.] the dishes'  
 c. me-laž'e 'he works'; yə-χate ye-lež'a 'he works his garden'  
 d. ma-k''e 'he goes'; mə-γ'eg'ə-r ye-k''a 'he goes this road'

An example of a relationship which shows no consistent directionality and which is formally somewhat more complex is provided by Verbs in (Boumaa) Fijian (Dixon 1988). Transitive Verbs in this language display one of a number of different transitive endings. In a great many cases, the same stem may appear with more than one of these endings, each such combination being related to a different syntactic frame. We would surely want to describe sets like those in (15) as derivationally related, but there is no consistent way to describe this relation as proceeding from some base to a derived form.<sup>8</sup>

- (15) a. yaqa-va 'crawl along like a crab *to* (e.g., a doorway)'; yaqa-ta'ina 'crawl along like a crab *with* (e.g., a gun)'  
 b. pu'u-ca 'be angry *at* (a person)'; pu'u-ca'ina 'be angry *about* (what was done)'  
 c. vana-a 'shoot *at* (e.g. a pig)'; vana-ta'ina 'shoot *with* (e.g. a gun)'  
 d. so'o-ta 'sail in (e.g., bad weather)'; so'o-va 'sail on (e.g., the ocean)'; so'o-ta'ina 'sail (e.g., a boat)'

Further examples are provided by similar phenomena in a number of languages. In the Algonquian languages, for instance, Verbs are organized into four conjugation classes depending on (a) transitivity, and (b) animacy of the intransitive subject or transitive object NP. The same stem typically appears with different extensions in more than one conjugation, but there is no consistent relationship among the forms that would allow us to establish a basic form and a direction of derivation leading to the full range of available Verbs.

In general, then, we ought to regard derivation as a relation between class of the sort discussed in section 3, rather than as a relation from one such class to another. Of course, in

<sup>8</sup>Dixon (1988 shows that it is not possible to take the stem alone, with no transitive ending, as the base of derivation in this case. This form may well exist, but its properties are not in general appropriate to serve as the basis of the transitive forms with extensions.



many (probably even most) cases the logical relation between derivationally connected classes is such that one can be projected from the other (rather than *vice versa*) in a directional way, but since this is not true in general, we ought to avoid a conception of the nature of derivation which forces such directionality on all such formations.

## 5 Derivational Clitics

Finally, we ask whether derivation is really limited to the case of relations between words, as implied in traditional formulations. In fact, much of the same sort of content which is signaled within words by derivational morphology can also be found in other cases signaled by clitics. For example, Hixkaryana (Derbyshire 1985) has a set of modifying 'particles' as in (16). These elements attach to phrases, but when we consider their semantics, we see it is entirely typical of the sort of material we expect to see in derivation.

- (16) heno 'dead, the late (of persons); set of (animals, objects)'  
 komo 'set, herd, group of'  
 tho 'devalued'  
 txko 'diminutive'  
 ymo 'augmentative'

In some languages, essentially the same content may be carried sometimes by a derivation affix and sometimes by a (phrasal) clitic. Yidiñ (Dixon 1977), for example, has a derivational affix *-bi* 'also, another' whose content is the same as that of a clitic *ɲuɹu*, as illustrated in (17).

- (17) a. ɲaɲaɲ buɲabiɲɲu wawa:l  
 1sg-Obj woman-bi-Erg  
 Another woman saw me  
 b. ... miɲa ɲayu buɲa:ɲɲuɹu  
 meat 1sg-Sbj ate-ɲuɹu  
 ... [and then] I also ate meat

Dixon argues that the two forms are functionally quite equivalent, as shown by their appearance in parallel within a single discourse, such as the conversational exchange in (18).

- (18) a. ɲundu waɲaɲɲuɹu gali:ɲ  
 you boomerang-ɲuɹu take-Imp  
 You take another boomerang!

- b. *ɣayu*    *waga:lbi*    *gali:ɣal*  
 1sg-Sbj boomerang-bi will-take  
 I'll take another boomerang

Indeed, we may find that the very same marker can be treated either as part of the form of a word — in which case it counts as 'derivational morphology' — or as a clitic constituting a part of a phrase. An example of this situation is provided by a set of "derivational clitics" in Warlpiri (Nash 1986). The elements in (19) can be used either as nominal affixes, in which case they appear inside of the marking of case, or as clitics, in which case they attach to anything. :

- (19) *katu* 'it would be better, Comparative'  
*mipa* 'only'  
*ngarrara* 'Superlative'  
*rlangu*, *malku* 'for example, also, even'  
*pinku* 'and the like, and its ilk'

Parallels between derivational morphology and (a subclass of) clitics are explored in Anderson 1992, 1993. Apart from similarities of form and function, these include the apparent fact that when a language has systems including both 'inflectional' clitics (e.g., pronominal forms, tense-markers) and derivational ones, the derivational ones come 'inside' of the inflectional ones within any given domain (e.g., Ngiyambaa, Donaldson 1980; Tagalog, Schachter & Otnes 1972 with some qualifications). Considerably more work remains to be done to establish the extent and formal basis of such parallels, but the evidence already available suggests strongly that the substantive content of the kind of relation we call "derivation" is shared by formal connections between phrases with and without certain clitics (or 'particles'). As a result, we should construe this relation in a way which is not limited to intra-lexical relations among words. Derivational relations obtain among those linguistic objects that have semantic, morphosyntactic and phonological content. In the general case, this means not just words but also phrases.

## 6 Conclusion

As a result of the various considerations adduced in the preceding sections, we conclude that a very different picture of derivation and derivational relations is required than that provided by the traditional 'concatenation of morphemes' approach. We do not presume to provide such an alternative theory here: our goal is rather to direct attention to the establishment of a more nearly adequate set of boundary conditions on such a theory than those implied in the traditional view.

At minimum, for example, we need to make a distinction similar to that between "Grammatical Processes" and the "Ideas expressed by grammatical processes" (in roughly the sense of Boas 1911). A modern formulation of much the same idea is the proposal to distinguish "Derivation," in the abstract sense of relations among lexical sub-classes characterized by various substantive properties, from the formal expression of these relations (Beard 1995). The set of grammatical processes in natural languages includes the formally monotonic addition of various sorts of affix, but is not limited to this. Similarly, as argued in section 2 above, the "ideas" expressed by grammatical processes may themselves involve non-monotonic relations between base and derived form.

Similarly, as argued in sections 3 and 4, we need to recognize derivation as a class of relations among existing lexical items, rather than just rules for building new items. This kind of view, similar to earlier proposals of Jackendoff (1975), requires us to take seriously the need to describe the internal coherence of classes of linguistic items. The items in question are generally elements of the lexicon (words), but as suggested in section 5, they may also be phrases when the formal reflection of the relation is a clitic. In either case, the central point is that we cannot rely on derivational operations to exhaust the nature of morphological structure and morphological relatedness, since membership in the relevant substantive classes is not reducible to any particular formal operation of word formation.

In general, all of these considerations require us to give up the centrality of what Bazell called "Yale morphemes," a class of minimal signs, in describing derivation (as well as other sorts of morphology: cf. Anderson 1992). I am pleased to be able to report that (at least at Yale) that development is already well under way.

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